

Inner Resources for School Achievement: Motivational Mediators of Children's Perceptions of Their Parents

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This study examined a process model of relations among children's perceptions of their parents, their motivation, and their performance in school. Children's perceptions of their parents on dimensions of autonomy support and involvement were measured with the new children's perceptions of parents scale. Three motivation variables—control understanding, perceived competence, and perceived autonomy—were hypothesized to mediate between children's perceptions of their parents and their school performance. Analyses indicated that perceived maternal autonomy support and involvement were positively associated with perceived competence, control understanding, and perceptions of autonomy. Perceived paternal autonomy support and involvement were related to perceived competence and autonomy. In turn, the 3 motivation variables, referred to as inner resources, predicted children's performance. Structural equation modeling generally supported the mediational model.

Amidst the current concern with attaining higher standards and greater "excellence" in schools, there has been an increasing research emphasis on variables, in both students and in the social context, that are predictive of academic performance. One line of this work has focused on a network of internal, motivationally relevant cognitive and affective constructs such as control understanding (i.e., children's understanding of who or what controls outcomes in their lives), sense of competence, and perceived autonomy (e.g., Deci, Schwartz, Sheinman, & Ryan, 1981; Dweck & Elliott, 1983; Ryan & Grolnick, 1986). Because a number of studies have linked these variables to achievement outcomes (e.g., Grolnick & Ryan, 1987), we have come to view these variables as inner resources necessary for mastery of the academic enterprise (Grolnick, 1990; Ryan & Grolnick, 1989).

A second important line of research has focused on the socializing influence of significant adults in the student's lives, most notably the students' parents. Several research programs have shown that variables such as parental belief systems, expectations, styles, and behavior patterns are related to academic or cognitive outcomes in children (e.g., Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987; Grolnick & Ryan, 1989; Hess, Shipman, Brophy, & Bear, 1969; Parsons, Adler, & Kaczala, 1982; Sigel, 1982).

The present research draws together and extends previous work from these two lines of research. In particular, we

address three questions relating to achievement, inner resources, and parenting. First, What are the relative contributions of the three inner resources—control understanding, perceived competence, and perceived autonomy—in predicting children's achievement? Second, Do children's perceptions of their parents relate to school outcomes? Although parent variables have been shown to relate to school achievement, the children's perceptions of those same variables are largely unexplored, even though some theorists (e.g., Blyth, 1982; Bronfenbrenner, 1977) have suggested that children's phenomenal view of their socializing environment is of considerable importance. Thus, in this study, we explore whether there are links between the children's perceptions of how their parents relate to them and their academic achievement. Because some research has revealed relations between children's perceptions of their socializing environment and adjustment outcomes (e.g., Schaefer, St. Clair, & Sayers, 1987; Bryant, 1974; Avery & Ryan, 1988), in this study we attempt to extend those findings to achievement outcomes.

The third question concerns the processes through which the perceived parental context impacts on children's achievement. In this work we assess the utility of a theoretical model in which motivationally relevant inner resources are mediators between children's perceptions of their parents and the children's academic performance. Our aim in examining this model is to shed light on the processes through which social contexts affect the adaptive behaviors of school children.

This project was supported by a research grant from the National Institute of Child Health and Human Development (HD 19914) to the Human Motivation Program, Department of Psychology, University of Rochester.

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Inner Resources of Achievement

The central element in motivation is intentionality, which concerns the determination to act toward a goal or engage in a particular behavior (Atkinson, 1964). Of central import to the formation of intentions is the belief that actions and

outcomes are reliably related. A plethora of research has suggested that unless people understand how to control outcomes, that is, the ways in which their own behaviors are linked to outcomes, intentional action will not ensue (Rotter, 1975; Seligman, 1975). In the present study, we used Connell's (1985) measure of unknown control (with the scale reversed) to assess children's control understanding. *Control understanding* reflects the degree to which children indicate that they understand who or what is responsible for their important school outcomes.

Other work has shown that, in addition to believing in behavior–outcome dependence, people must believe that they are sufficiently competent to execute the instrumental actions. Such beliefs are termed *perceived competence* (Bandura, 1977). In the present study, we examined perceived competence in the academic domain using Harter's (1985) Self-Perception Profile for Children.

Thus, intentionality has at least two prerequisites: control understanding and perceptions of competence. Deci and Ryan (1987) pointed out, however, that the beliefs necessary for intentional action do not ensure the autonomous initiation and regulation of that action. They suggested a further distinction within the realm of intentional behavior, namely autonomous versus controlled behavior. Autonomy concerns the degree to which the initiation and regulation of action emanates from one's core sense of self. In contrast, controlled activity describes the process of yielding to pressure from some force, whether it be an external inducement or nonintegrated intrapsychic demand. Thus, for example, people can understand what behavior produces an outcome and can feel competent to perform that behavior, while at the same time feeling forced or coerced into doing the instrumental action. As such, they would feel that they have to do the behavior and that they do not have a true sense of autonomy. To assess relative autonomy, we used a scale that examines children's reasons for engaging in school activities, ranging from less to more autonomous reasons (Ryan & Connell, 1989).

These three concepts—control understanding, perceived competence, and relative autonomy—have been found to be critical motivational resources. Children who report that they know what controls outcomes in school, for example, are rated by teachers as more engaged in school activities and are higher in achievement and grades than are those with less control understanding (Skinner, Wellborn, & Connell, 1990). Children high in perceived competence are lower in classroom anxiety and higher in preference for challenging work than those low on this dimension (Harter, 1982). Relative autonomy has also been linked to school competence (Ryan & Connell, 1989), as well as to children's long-term memory for grade-level text material (Grolnick & Ryan, 1987).

Furthermore, there is reason to believe that there are systematic links among these three inner resources. Children who understand the sources of control in the classroom are more likely to feel competent in obtaining school-related outcomes than children who do not. Furthermore, children are most likely to feel autonomous at tasks for which they have high control understanding and high perceived competence. Work by Ryan and Connell (1989) and Marsh and Gouvenet (1989) supports these hypothesized relationships among the three variables.

The Parenting Environment: Promoting Inner Resources

Several recent studies have explored the ways in which students' motivation for learning can be enhanced versus undermined by factors in the home and classroom environments (deCharms, 1976; Deci et al., 1981; Grolnick & Ryan, 1989; Ryan & Grolnick, 1986). In this research, two dimensions have been proposed as important for facilitating inner resources in children: autonomy support versus control, that is, the degree to which parents encourage children to initiate and make their own choices rather than apply pressure and inducements to control the children's behavior, and involvement versus noninvolvement, that is, the degree to which parents are interested in, knowledgeable about, and spend time relating to their children concerning activities and experiences such as schoolwork.

Numerous studies have provided at least indirect support for the utility of these two dimensions as predictors of developmental outcomes. Studies examining variables related to autonomy support (most typically focusing on control, which is the absence of autonomy support) have found that parental emphasis on obedience, compliance, and the use of power-assertive techniques leads children to be less social (Baldwin, 1955), more hostile (Hoffman, 1960), more dysphoric and disaffiliated (Baumrind, 1967), and less adjusted (Schaefer, 1965). We hypothesized that parents high in autonomy support would allow their children to develop a sense of themselves as the locus of initiation (or causality) of their actions, thus promoting more perceived autonomy, greater perceptions of competence, and higher control understanding.

Several researchers have also provided evidence about the effects of the second dimension, involvement. For example, high levels of involvement were found to be associated with competence and achievement motivation (Pulkkinen, 1982), and low levels of involvement were related to disobedience and aggression (Hatfield, Ferguson, & Alpert, 1967). Furthermore, Gordon, Nowicki, and Wickern (1981) related maternal involvement to the development of an internal locus of control, and Stevenson and Baker (1987) reported a positive association between parent involvement in school activities and children's school performance. On the basis of these findings, we suggest that children of highly involved parents will feel more competent, display greater control understanding, and have more autonomous academic motivational orientations than will those of less involved parents.

A recent interview study¹ of mothers and fathers assessed both the autonomy support and involvement dimensions (Grolnick & Ryan, 1989). The researchers found that children of parents rated by the interviewers as highly autonomy supportive had higher self-reported and other-reported competence, showed more independent self-regulation, and evidenced fewer school adjustment problems than did children of parents rated highly controlling. Additionally, the researchers found maternal involvement to be related to greater control understanding and teacher-rated competence and to fewer adjustment problems.

¹ The sample used in Grolnick and Ryan's (1989) interview study was a subset of 48 of the families used in the present study.

This study extends Grolnick and Ryan's (1989) research in several ways. First, we examined children's perceptions of their parents' autonomy support and involvement (rather than interviewers' ratings or parent self-reports) because it is possible that children's unique interpretations of their parent's behavior may have interesting relations to various mediating and outcome variables. Second, we focused on indices of school performance as outcome variables. Third, we tested a process model of the relations among children's perceptions of their parents, the children's motivational resources, and the children's school performance.

A Process Model:

The Parental Environment and Achievement

Most studies of perceived parenting style have examined relations with achievement or personality outcomes, although these studies have led to inconsistent results (McCrae & Costa, 1988). In our model, we view the child as an active organizer of his or her experience. Inputs from the environment are interpreted and evaluated and, in turn, affect the child's motivation and subsequent actions. Thus, we predict that the environment the child perceives impacts on the child's experience and motivation rather than directly on school outcomes, so any lack of consistent relations between context and outcomes in previous studies could be due to researchers' failure to consider these mediating child variables. We hypothesize that within the phenomenal world of the child, perceptions of parenting styles promote or forestall development of inner motivational resources, which, in turn, impact on school performance. This model can be contrasted with the direct effects model, in which perceived parenting style impacts directly on achievement. We evaluate the fit of the data to these models in this study.

Method

Subjects

Although we believe that the hypothesized model of school performance is a general one, the choice of children in their elementary school years as research subjects seemed to be particularly appropriate. Children of this age are old enough to respond reliably to questionnaires and to make distinctions among domains of activity (Connell, 1985; Harter, 1982), a point that is important because this study focused specifically on the academic domain. Furthermore, children's self-concepts are crystallizing during this period, and their achievement trajectories have become relatively stable (Alexander & Entwisle, 1988). Finally, the influence of parents on achievement may be clearer in elementary school students than in high school or college students.

Accordingly, subjects were 456 children in Grades 3 through 6 from 20 classrooms in a large-town school district that was a mix of farm families and families in which parent(s) commuted to work to a nearby city. The sample was largely White and heterogeneous in socioeconomic status (SES). Children in the sample completed self-report scales, and teachers completed competence ratings of the children. A subset of the parents of these children (248 mothers, 188 fathers) completed a short questionnaire about their parenting behavior, which was used as part of the construct validity of the children's perceptions of parents scale. Another smaller subset of the parents (n

= 48 families) were interviewed and rated by observers for their parenting styles. These data were also used to evaluate the validity of children's ratings of parents.

In addition to the primary sample of 456 children, four other samples of children in Grades 4 through 6 were used in developing the perceptions of parents measure administered in this study. These were the following: a sample of 73 from a middle-SES suburban school; a sample of 192 from a middle-SES small-city school district, a sample of 559 from a middle-SES to upper-middle-SES suburban school district; and a sample of 160 low- to middle-SES children from an inner-city school.

Children's Perceptions of Parents Scale

This study is the first to use the children's perceptions of parents scale. Therefore, we provide a brief account of its development.

Scale construction. First, the 73-children sample completed an original survey of 40 items related to maternal autonomy support and involvement. On the basis of descriptive statistics and interitem correlations, 15 of these items were retained in their original form, and 5 others were slightly rewritten. These 20 items were expanded to 40 by applying them to fathers as well as mothers, and this version of the scale was completed by the sample of 192 children. On the basis of factor analysis and descriptive statistics, 34 of the 40 items were retained and administered to the sample of 559 children. Factor analyses of these data revealed a shorter, 21-item version (11 mother items and 10 father items) that was as reliable and valid as the longer version, so the shorter version was used in all subsequent work.

Question format and administration. We used identical procedures in administering the scale to all samples. Questionnaires were group administered in the classroom by two trained examiners: one read items aloud and the second was available to answer questions from individual children. Questions were few, however, as the scale proved clear and easy to complete. Teachers were not present for scale administration.

The item format is similar to that used by Harter in her perceived competence scale (Harter, 1982) and intrinsic/extrinsic orientation scale (Harter, 1981). The child first decides which of two types of parents his or hers are most like and then decides whether this is "sort of true" or "really true" of the parent. The result is a 4-point Likert-type ordinal scale, with low scores indicating low paternal/maternal autonomy support or involvement. In the scale, however, items are worded in both positive and negative directions. Children who had only one parent completed only the relevant items. A sample autonomy-support item is the following: "Some mothers are always telling their children what to do *but* other mothers like their children to decide for themselves what to do." A sample involvement item is: "Some fathers don't have enough time to talk to their children about their problems *but* other fathers always have time to talk to their children about their problems."

Validity. Factor analytic and internal consistency analyses were done on two of the four preliminary samples: the urban sample of 110 children and the suburban sample of 559 children. Using a principal-component procedure with promax rotation, we found four highly similar factors (two maternal and two paternal) for each sample. All loadings on the appropriate factor exceeded .35, and cross-loadings never exceeded this figure. Internal consistency data (Cronbach's alpha with raw scores), for the urban and suburban samples, respectively, were .70 and .67 for maternal autonomy support, .66 and .58 for maternal involvement, .66 and .55 for paternal autonomy support, and .66 and .67 for paternal involvement. In both the urban and suburban samples, maternal and paternal autonomy support were moderately significantly correlated as were maternal and paternal involvement.

Other Child-Completed Measures

The Multidimensional Measure of Children's Perceptions of Control (MMPCPC), developed by Connell (1985), is a self-report measure for 8- to 14-year-olds that assesses their understanding of who or what controls important success and failure outcomes in their everyday lives. This measure assesses three sources of control (internal, powerful others, and unknown) across three content domains (cognitive, social, and physical). It also includes a general (non-domain-specific) control-understanding scale. In this study we used only the unknown control scores (the reverse of which we refer to as control understanding) in the cognitive domain. A sample item from this scale is the following: "When I get a good grade in school I usually don't understand why I did so well." The internal consistency coefficient for this subscale is .68.

The Self-Perception Profile for Children (Harter, 1985) assesses children's perceived competence in two domains (scholastic and athletic) and their self-adequacy with regard to behavior, appearance, and social spheres. In addition, there is a subscale measuring global self-worth. For the present study, we used the scholastic (school) perceived competence scores. Items present two types of students (e.g., "Some children do very well at their classwork but other children don't do very well at their classwork"), and children decide which type they are most like and then how true the chosen description is for them. This scale and its predecessor are widely used and well validated (Harter, 1982, 1985).

The Self Regulation Scale (Ryan & Connell, 1989) is a 26-item scale that assesses children's styles of self-regulation in the academic domain. Each item represents a reason why the child performs activities such as doing homework, doing class work, or answering hard questions in class, followed by a 4-point Likert-type scale on which the child indicates how true that reason is for his or her own behavior. Included in the scale are four subscales, ranging from less to more self-determined styles of regulation: External (measures engagement in activities to avoid external consequences or to obey rules), Introjected (measures behavior conducted to avoid guilt or anxiety or to gain adult approval), Identified (measures behavior performed to achieve a self-valued goal), and Intrinsic (measures behavior performed for inherent enjoyment). An example of an external reason for why a child might do his or her homework is "because I'll get in trouble if I don't." A sample identified reason is "because I want to understand the subject." Internal consistency estimates for the subscales range from .62 to .82. Subscales can be used separately or in combination to form a summary score called the relative autonomy index. Ryan and Connell have presented extensive evidence for the construct validity of the scale. The relative autonomy index has been shown to correlate appropriately with scales of self-rated and other-rated motivation (e.g., Harter, 1981), perceived competence (Harter, 1982), and perceptions of the classroom environment as origin promoting (deCharms, 1976).

Teacher-Completed Measures

Teacher rating scale. Teachers' ratings of children's academic competence were measured by the teacher rating scale, an 8-item scale. This measure evaluates three aspects of children's school-related competence: academic competence (e.g., "How well does this child do in school?"); motivation (e.g., "How hard does this child try in school?"); and independence (e.g., "How independent is this child in seeing that his/her school work gets done?"). Each item is worded as a question to which the teacher responds on a 4-point scale. Factor analysis of this questionnaire revealed a clear one-factor solution (eigenvalue = 3.48). Accordingly, the items were averaged to form one summary score. The internal consistency of this scale is .92.

Classroom grades. We measured children's class performance by year-end grades in mathematics and reading. Grades were coded on a 7-point scale ranging from *E* (1) to *A+* (7) and were averaged across these two subject areas.

Achievement test scores. We measured general academic achievement by the mean of the current year's Metropolitan Achievement Test Math and Reading scores for Grades 4 and 5 and Pupil Educational Progress test scores for Grades 3 and 6. The Pupil Educational Progress test is a New York State-mandated test administered in these grades. Scores were standardized with each grade's mean and standard deviation.

Results

Preliminary Analyses of the Children's Perceptions of Parents Scale

Factor analyses. Factor analyses on children's perceptions of parents scale data from the primary sample of 456 children duplicated the results from the earlier samples. Two maternal factors and the corresponding two paternal factors composed of the same items were obtained,² with all loadings on the appropriate factor exceeding .35 and cross-loadings never exceeding this figure.

Internal consistency. Subscale alphas (Cronbach's) were .53 on maternal autonomy support; .56 for maternal involvement; .67 for paternal autonomy support; and .64 for paternal involvement. These results are similar to those from the earlier samples and compare favorably with those from existing self-report measures for children (e.g., Nowicki & Strickland, 1973; Connell, 1985).

Gender, grade, and parent effects. To examine gender, grade, and parent (mother versus father) effects on perceptions of autonomy support and involvement, we conducted a multivariate analysis of variance (MANOVA), with two between-subjects factors (gender and grade) and one within-subject factor (mother vs. father). We included all two-way interactions. The MANOVA revealed a significant main effect for parent, $F(2, 444) = 93.30, p < .001$, and a significant Grade \times Parent interaction, $F(6, 890) = 2.71, p < .02$. Because significant results were obtained in the MANOVA, we conducted ANOVAs for involvement and autonomy support separately.

Results of the ANOVAs revealed a parent main effect for both involvement, $F(1, 453) = 110.55, p < .001$, and autonomy support, $F(1, 453) = 88.14, p < .001$. Mothers were rated as more involved and more autonomy supportive than were fathers. A main effect was also found for grade on the parental involvement variable, $F(3, 451) = 2.82, p < .05$. Older children perceived their parents as somewhat less involved than younger children. There was also a Grade \times Parent effect for involvement, $F(3, 451) = 4.48, p < .01$, suggesting that fathers

² Retention of factors was based on both the Scree test (Cattell, 1966), which plots the incremental variance accounted for by each successive factor to determine the point at which the variance levels out, and the Mineigen criterion, which requires that only factors with eigenvalues of 1.0 or greater be retained. For each of the samples, two factors and no more than two met both of these criteria.

(more than mothers) were perceived as decreasing in their involvement across grade level (particularly between fourth and fifth grades.)

Intercorrelations. Intercorrelations among the four parent-perceptions subscales are presented in Table 1. The findings suggest a parental consistency effect in that maternal and paternal autonomy support were related, as were maternal and paternal involvement. Within-gender and within-grade correlations between parental dimensions yielded findings similar to those for the combined analyses reported in Table 1.

Cross-method correlations. We assessed the degree of convergence of children's perceptions of their parents with interviewers' ratings of the parents by correlating the four subscales of the children's perceptions of parents scale with interview ratings of mothers' and fathers' autonomy support and involvement in a subset of the sample ($n = 48$ families). Children's perceptions of their mothers' autonomy support was significantly related to interview ratings of maternal autonomy support ($r = .36, p < .005$). Similarly, mothers rated as more involved on the basis of the interview were also rated by their children as more involved ($r = .28, p < .05$). As expected, there were no significant cross-dimension correlations for interview and child ratings. Children's perceptions of paternal involvement were positively related to father interview-rated involvement ($r = .33, p < .03$). However, the correlation between children's perceptions of their fathers' autonomy support and interviewers' ratings on that dimension was not significant ($r = .12$). There were no significant cross-dimension correlations for father dimensions.

A larger subsample of the parents (248 mothers, 188 fathers) completed a short self-rating questionnaire assessing their

behavior relevant to autonomy support and involvement. The autonomy-support items measured the parents' degree of pressuring the children (reversed) and allowing choice for the children. The involvement items inquired about the parents' time and attention devoted to the child's schoolwork and homework. We calculated correlations between the parents' self-reports and the children's perceptions of their parents. Mothers' autonomy support and their children's perception of support for their autonomy were significantly correlated, as expected ($r = .14, p < .05$). Similarly, mothers' reports of attention to their children and their children's perception of them as involved were positively correlated ($r = .21, p < .01$). For fathers, the autonomy-support dimensions were not significantly correlated, although, as expected, the involvement dimensions were significantly correlated ($r = .20, p < .01$).

Primary Analyses

Perceptions of parents, inner resources, and performance outcomes. Table 1 presents correlations among the three inner resources, performance outcomes, and perceptions of parents. The relative autonomy index was uncorrelated with control understanding but was significantly related to perceived competence. Control understanding and perceived competence were also related in the expected direction. These correlations indicated shared variance but considerable independence among these constructs. All three inner resource variables were significantly correlated with each of the three performance outcome variables (viz., grades, achievement scores, and teacher-rated competence).

We performed a set of multiple regressions to determine the percentage of variance in the teacher-rated competence

Table 1
Correlations Among Subscales of the Children's Perceptions of Parents Scale, Inner Resources, and Academic Performance Outcomes

Variable	MA	MI	FA	FI	CU	PC	RA	GR	ACH	TR
Children's perceptions of parents scale										
Mother autonomy support (MA)	—									
Mother involvement (MI)	.14***	—								
Father autonomy support (FA)	.45***	.01	—							
Father involvement (FI)	.02	.37***	.00	—						
Inner resources										
Control understanding (CU)	.12**	.13**	-.01	-.04	—					
Perceived competence (PC)	.27***	.15**	.20***	.12**	.21***	—				
Relative autonomy (RA)	.23***	.11*	.20***	.13**	.06	.25***	—			
Academic performance outcomes										
Grades (GR)	.06	-.03	.03	-.06	.17***	.32***	.16***	—		
Achievement (ACH)	.10*	-.08	.02	-.01	.26***	.35***	.15**	.58***	—	
Teacher ratings (TR)	.18***	-.01	-.01	-.05	.15**	.39***	.21***	.64***	.60***	—

Note. $N = 456$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

and performance variables accounted for by the set of inner resources and to examine independent contributions of each inner resource to outcome prediction. Each outcome was regressed simultaneously onto the set of inner resources. The results, depicted in Table 2, indicate that the set of inner resources accounted for 13% of the variance in grades, 17% of the variance in achievement scores, and 16% of the variance in teacher-rated competence. For grades and achievement scores, all three F values for the inner resources were significant predictors in the model, whereas for teacher-rated competence two predictors—perceived competence and relative autonomy—reached significance.

The relations between perceptions of parents and inner resources, shown in Table 1, indicate that control understanding was significantly correlated with maternal autonomy support and involvement. Furthermore, both perceived competence and relative autonomy were significantly correlated with all four of the parent perception variables. A greater number of significant relations emerged between autonomy support and inner resources than between involvement and inner resources.

Relations between parent perceptions and performance outcome variables were generally minimal, with only 2 of the 12 correlations being significant. Maternal autonomy support was positively correlated with both achievement test scores and teacher ratings of competence, although these relations were weak.

A model of parent influence. The final analyses concerned a theoretical model in which the student's motivation or inner resources are hypothesized to mediate between the experience of the parental context and academic achievement. Thus, we hypothesized that perceived parent styles would directly predict inner resource variables, which would then lead to differences in school achievement.

We tested the specified theoretical model using maximum likelihood analysis of structural equations. We analyzed the data with LISREL VII.16 (Jöreskog & Sörbom, 1989), which enables one to test the overall fit of the theoretical model to the data and to compare the fit to that of alternative models. The model was specified as a recursive model, with parent perceptions (conceptualized as exogenous variables) predicting inner resources (endogenous variables) and inner resources predicting school performance (a latent endogenous variable). In this study, we also tested the alternative model that the perceived parental context would impact directly on achievement outcomes without motivational mediation. Two convenient ways to summarize the fit of the model to the observed pattern of data provided in the Jöreskog and Sörbom framework are the chi-square of the fit of the model and the heuristically valuable overall goodness-of-fit index. The goodness-of-fit index indicates the relative amount of observed variance and covariance accounted for by the model and varies from zero to one.

Figure 1 depicts our hypothesized theoretical model. Consistent with standard LISREL notation, observed variables are presented as rectangles, whereas unobserved or latent variables are presented as circles. In the model there is one latent variable, academic achievement, which is composed of grades and achievement test scores. (Teacher-rated competence was not included in the model because it included direct

ratings of children's motivation and therefore could have both internal resources and performance components and thus could potentially inflate the path coefficients.)

In the first step of the procedure, we tested our theoretical model of only indirect paths from parent context to achievement outcomes. The results indicated a moderate fit for the model, $\chi^2(10, N = 456) = 27.22, p < .002$, with an adjusted goodness-of-fit index of .951. The best fitting models do not have a significant probability value; in other words, they have a low chi-square value relative to degrees of freedom. However, because chi-square is directly proportional to sample size, it is difficult to produce a nonsignificant chi-square, so the current fit is considered reasonable, although the chosen procedure emphasizes the comparison of the fits of the two models. The LISREL procedure also provides a set of modification indices that signify which additional paths could be included in the test model to improve the fit.³ In this case, the results suggested that the fit would be improved by adding a path between maternal involvement and achievement.

We then tested the alternative model, which included the indirect paths as well as the direct paths from each of the perceived parent context variables to achievement. We contrasted this model with the indirect effects model and found an improved fit, $\chi^2(6, N = 456) = 9.21, p < .16$, adjusted goodness-of-fit = .972. A test of the difference between the two chi-square values indicated a significant result, $\chi^2(4, N = 456) = 18.01, p < .01$, suggesting that the new model does provide a better fit to the data. Examination of the parameter estimates revealed only one significant direct path between parent variables and academic achievement, namely, a negative path between maternal involvement and achievement. Because this path was not hypothesized and the direction of causality is therefore ambiguous, it is represented by a double-headed arrow. The results of the two tests therefore yielded similar findings, namely that the best fit comes from the indirect model (with motivation variables mediating between perceptions of parents and academic achievement), supplemented by the one direct path.

Figure 2 presents the model, which contains one double-headed path,⁴ that emerged in the second analysis.^{5,6} Only

³ The modification indices provided by LISREL represent the minimum decrease in overall chi-square that would be achieved if the corresponding parameter were freed.

⁴ Inclusion of the two-way path (as opposed to a one-way path) did not alter the model fit (chi-square) or the parameter estimates for paths between the parenting environment and inner resources. It did slightly alter the magnitude of paths between the inner resources and the achievement variable. However, these differences did not change the interpretation of the model; no paths were significant when the two-headed arrow was included that were not significant in the one-way model and vice versa.

⁵ Although post hoc model modification could be conducted based on the results of the second analysis and a new model presented with only the significant direct paths included, we decided to present only the models specified for testing prior to the study. Data-based generation of alternative models is not recommended (MacCallum, 1986) as it may capitalize on sample characteristics.

⁶ LISREL also provides other information about the fit of aspects of the model to the data in a set of matrices. In this model, the error

Table 2
Statistics for Regressions of Academic Performance Outcomes and Teacher Ratings Onto Inner Resource Variables

Academic performance outcomes	Inner resources						Total R^2
	Control understanding		Relative autonomy		Perceived competence		
	F	β	F	β	F	β	
Grades	6.98*	.13	8.29*	.03	42.00**	.44	.13
Achievement	23.26**	.23	14.20**	.04	48.87**	.44	.17
Teacher ratings	1.16	.06	19.79**	.05	50.80**	.51	.16

* $p < .01$. ** $p < .001$.

those paths that were significant at the $p < .05$ level ($t > 1.96$) are included. Numbers associated with the paths are maximum likelihood estimates (corresponding to beta weights in a regression procedure). The results suggest that maternal and paternal involvement predicted control understanding as did maternal autonomy support. Perceived competence was predicted by father involvement and by mother and father autonomy support. Significant direct paths to relative autonomy were from father involvement and mother and father autonomy support. All direct paths from inner resources to academic achievement were significant.

Discussion

The present project was concerned with children's perceptions of their parents' autonomy support and involvement and the ways in which those perceptions predict the children's motivation and achievement in school. In the research we used the children's perceptions of parents scale, developed for use in this study, and related children's perceptions to motivationally relevant inner resources and to achievement outcomes. In addition, we tested a process model in which inner resources were predicted to mediate between children's perceptions of their parents and their school performance.

In evaluating the results, we consider the validity of the children's perceptions of parents scale and the meaning of children's perceptions more generally. Factor analyses yielded the two target dimensions of perceived autonomy support and involvement for each parent. These were replicated in three samples, and adequate internal consistency reliabilities (.53 to .64) were attained. Comparisons of the children's perceptions of their parents with the parents' self-reports and interview ratings yielded modest correlations, thus offering some convergent and discriminant validity for the children's perceptions. Only on father autonomy support was there no significant correlation.

Descriptive data from the children's perceptions of parents scale revealed that children reported more autonomy support

and more involvement for mothers than fathers. The analyses also suggested a parent consistency model in that correlations between mother and father within dimension exceeded correlations between dimensions for each parent considered alone. This finding is similar to findings of other parenting researchers (e.g., Schaefer et al., 1987; Schwarz, Barton-Henry, & Pruzinsky, 1985) and may result from shared values between spouses. Alternatively, this finding may result from the fact that children may exert a similar influence on both parents (Bell, 1968); in other words, children "pull" for more or less control from adults. This tendency may be associated with individual differences in the children's personalities (Ryan & Grolnick, 1986) and may even have its roots in temperamental differences (Rowe, 1981, 1983). The fact that children's perceptions of the two adults were only moderately correlated may, in part, stem from differences between mothers and fathers in their expectations for children's behavior.

In examining the inner resource variables in relation to achievement, we found that they accounted for a significant proportion of the variance in achievement outcomes, with each of the three variables independently adding to the predictive model. Not surprisingly, the control understanding and perceived competence variables had stronger linkages with achievement than did perceived autonomy. This may be because the control and competence variables are specifically concerned with the child's knowing how and feeling able to attain achievement outcomes. A lack of either of these resources would interfere directly with achievement outcomes. Perceived autonomy pertains to why a child engages in achievement behaviors, and it is likely that working for any reason, even an external one, could be associated with positive performance. Importantly, however, perceiving the reasons for one's behaviors to be more versus less autonomous also contributes uniquely to predicting school achievement.

In examining the structural model of perceived context, inner resources, and achievement outcomes, we found not only that the inner resources predicted achievement but that they mediated between perceptions of the parent context and achievement. In particular, maternal and paternal autonomy support and involvement positively predicted control understanding, perceived competence, and relative autonomy, all of which in turn predicted achievement.

Interestingly, within the model there was little indication that children's perceptions of their mothers influence more aspects of children's motivational development than do children's perceptions of their fathers. This contrasts with the

associated with measurement of the latent variable (theta epsilon) was .53 for grades and .27 for achievement test scores, indicating good fit for the measurement model. Another error measure concerns the error involved in predicting the endogenous variables (both observed and latent). This information is contained in the psi matrix. The error values obtained for this matrix ranged from $-.20$ to $.47$, again indicating a good fit of the model to the data.

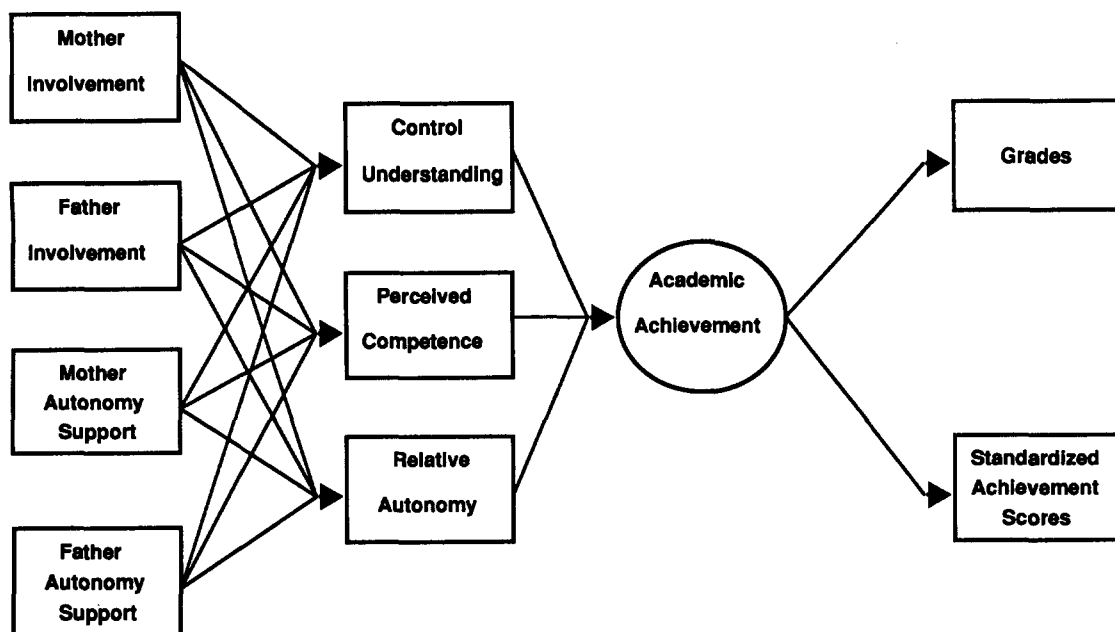


Figure 1. Hypothetical process model of relations between perceptions of parental context, children's inner resources, and academic achievement.

results of an interview study in which paternal involvement, in particular, was uncorrelated with children's self-regulation and competence, whereas maternal involvement showed strong relations with these outcomes (Grolnick & Ryan, 1989). It is possible that children's feeling that their fathers are concerned with and involved with them is more critical than more objective ratings would suggest. In any case, the combined results of the two studies suggest that the influence of fathers on motivational development may be complex and merits further study.

An interesting, unpredicted finding was the direct path between maternal involvement and performance within the second model tested. This negative path was not the result of a suppression effect, as negative (albeit small) zero-order correlations were in evidence between maternal involvement and both grades and achievement scores. Thus, the finding suggests an influence in which mothers whose children are not doing well in school become more involved with them, perhaps as a response to the children's behavior. However, because this finding was not predicted, the alternative explanation, that mothers' involvement leads to less achievement on the part of their children, must also be entertained. If that were the case, it could indicate, as has been suggested previously (Grolnick & Ryan, 1987), that excessive involvement may be experienced as intrusive by children.

Our model did not include parent variables that were either self-report or observationally based as have many studies, and future work could certainly include these non-child-based assessments of the context to explore more fully what contributes to the children's perceptions of the social context. Nevertheless, by comparing the present research to a previous study (Grolnick & Ryan, 1989), we note ways in which the present results build on the previous results, as well as ways in which

the findings of the two studies differ. For example, interviewer ratings of maternal involvement positively predicted achievement, but children's perceptions of maternal involvement were positively associated with achievement only indirectly, thus supporting our mediational view of the child's phenomenal experience. Similarly, interviewer ratings of father involvement did not correlate with children's inner resources, whereas the children's perceptions of their father's involvement did. This suggests that children must feel the contextual nutrients if they are to positively impact the children's motivation.

In general, in the two studies, the sets of contextual variables, the child's inner resources, and the child's school performance do show converging patterns of relations, thus confirming the importance of the construct set with which we are working. Perhaps the most noteworthy divergence is the finding that interview ratings and self-reports of father autonomy support do not correlate significantly with children's perceptions of their fathers' autonomy support. There is no clear data-based interpretation of this result, although we might speculate that many fathers play a strong disciplinary role and that their children code their fathers' autonomy support versus control primarily on the basis of these critical incidents, whereas the fathers themselves or interviewers would place such incidents in a broader context of ongoing behaviors. It should be noted that the interview was not considered an absolute criterion for children's perceptions because children's perceptions are a unique index. Instead, relations between children's perceptions and parent and observer reports were considered one piece of converging evidence for the construct validity of the measure of children's perceptions. Another piece of confirming evidence was the significant relations between children's perceptions of father

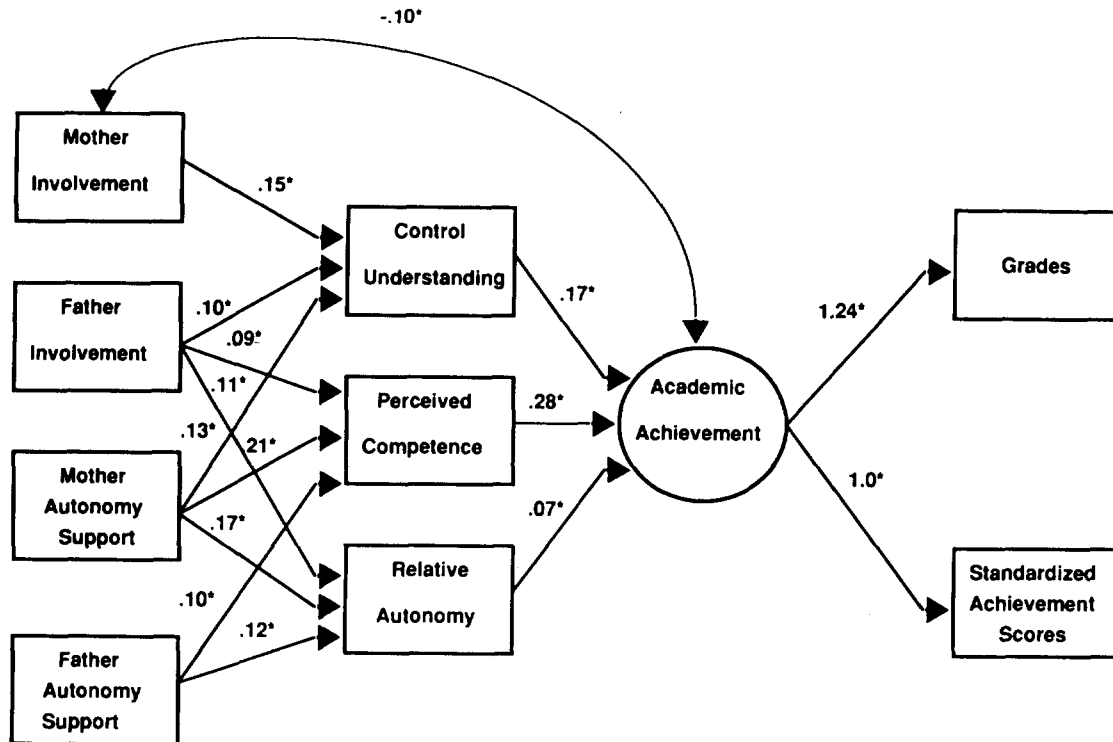


Figure 2. Path diagram of estimated structural model. (Only paths significant at $t > 1.96$, $p < .05$, are shown, as indicated by asterisks. Numeric values are standardized maximum likelihood estimates of the relations among variables.)

autonomy support and children's motivation. Nevertheless, the relations among various sources of information about environments requires further study.

The model that was tested, which is heuristically valuable and received moderately strong support, has certain limitations. The structural model was based on a priori specification of directional influences. "Arrows" of influence could, however, move in either direction and are undoubtedly of a reciprocal nature. Furthermore, we note the cultural relativity of our model and findings; different patterns of relations would likely emerge, for example, in cases in which parental authority is less questioned by students (Rohner & Pettengill, 1985).

In general, our results direct attention toward the inner processes that are at work in student achievement. Contexts and curricula that conduce toward inner motivation rather than external control and toward felt competence rather than objective evaluation seem to be important facilitators of successful educational climates and outcomes.

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Received September 15, 1990

Revision received June 10, 1991

Accepted June 27, 1991 ■